

Analysis of Milk Consumption for Toddlers in the District of Tompaso Barat, Regency of Minahasa, Province of North Sulawesi

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Abstract— The research aims to know the total toddlers' milk consumption and the determining factors of total toddlers' milk consumption in the District of Tompaso Barat, Regency of Minahasa. The sample selection of villages and respondents was the purposive sampling, which were selected based on a certain consideration or criteria, and total respondents were 30 households. The analysis method used was both descriptive and statistic, which was multiple regression analysis. The results of the research find out that the average total toddlers' milk consumption was 120 grams/day or 3.733 grams/month. The determining factors, having a positive impact on total toddlers' milk consumption, were the household's income, mother's educational background, and percentage of expenses of milk consumption, but the educational background had an insignificant impact. Also, the factor of toddler age and the price had a negative impact on total toddlers' milk consumption, but the price had the only factor having a significant impact.

I. INTRODUCTION

A consumer's need for animal-sourced foods, such as dairy having high nutrition, demands a significant number. It, then, raises human awareness of the nutrition significance, contained in the husbandry products. Specifically, dairy is one of the husbandry products, and its nutritional value is significant and required by every group of society.

Milk is highly beneficial for early childhood since its protein and mineral are important for the development and growth of the body's tissue [1]. Similarly, [2] argued that milk has a significant role in optimizing children's development and growth. The satisfaction of nutrition for toddlers can be fulfilled with food and drinking intake. One of them is milk, which is one kind of food and drinking and has sufficient nutrition required by every group of age.

According to [3], formula milk has a strategic role in procuring nutrition sufficiency for the Indonesian baby. Then, a family having a toddler prioritizes milk derived from husbandry products as the substitution of ASI for the sustainability of the toddler's growth. In addition, the current household pattern is more oriented toward milk derived from husbandry products due to its numerous nutrient compositions.

Typically, dairy, a husbandry product and considered a luxuriously consumptive product, has a relatively higher price than other husbandry products. Milk consumption in Indonesia is only consumed by the middle-upper class. Thus, it requires more money to obtain milk than other primary needs. This situation pushes households to work harder to obtain more income to buy milk. Further, every household will somehow strive to satisfy life necessities and improve household income.

Administratively, the District of Tompaso Barat has 14.61 km² of area, divided into 10 villages and 30 sub-villages, and the total population is 9,025 people or 2,685 heads of the family. Mostly, the residents of the District of Tompaso Barat are farmers and traders. In 2021, the District of Tompaso Barat had relatively many toddlers, which was 607 toddlers (Table 1). Table 1 demonstrates that milk consumption for toddlers is highly required,

considering that most mothers having toddlers also work for living in satisfying household needs, including milk for their toddlers. The factor of household's income is one of the determinants in milk purchasing power, purposed for toddler's growth. However, considering the expensive price of milk, a mother must involve in increasing the household's income.

Table 1: Total toddlers of the district of Tompaso Barat

No.	Name of Village	Total Toddlers	Total Heads of Family	Total Members of Family
1.	Pinaesaan	32	32	99
2	Tompaso Dua	127	124	379
3	Tompaso Dua Utara	45	45	141
4	Pinabetengan Utara	90	90	277
5	Pinabetengan	39	37	122
6	Pinabetengan Selatan	58	58	183
7	Tonsewer Induk	64	64	197
8	Tonsewer Selatan	63	63	192
9	Toure	50	48	159
10	Toure Dua	39	38	127
Total		607	599	1,876

Source: Data of Posyandu (Integrated Health Service) in the District of Tompaso Barat, 2021

Specifically, young mothers, temporarily nurturing and caring for toddlers, involve in various working activities to add to their household's income, so they, presumably, do not provide maximal ASI (mother's breast milk) to their toddler. Income shows the amount of a monthly revenue gained by a household derived from either head of the family or other members of the family working to satisfy life needs.

Then, the research aims to know the total toddler's milk consumption and analyze the impacts of the household's income, mother's educational background, age of the toddler, percentage of expenses of milk consumption, and price of milk on the total toddler's milk consumption in the District of Tompaso Barat, Regency of Minahasa. The results of this study, theoretically, are expected to provide encouragement for mothers to continue working to increase household income in satisfying the daily needs of milk intake for toddlers.

II. METHODOLOGY

The research site was the District of Tompaso Barat, Regency of Minahasa. The research had been performed from June up to July 2021.

The type of collected data consisted of both primary and secondary. The primary data was obtained from the household, mainly those having toddlers, using a questionnaire and a direct interview with respondents. While, the secondary data was obtained from institutions related to this research, such as data from the village, district, and statistics.

The sampling method of village and respondent employed the purposive sampling, such as based on certain considerations and criteria. The consideration was as follows:

- There was the largest population of young families located in the District of Tompaso Barat, Regency of Minahasa, such as the Village of Tompaso Dua, Pinabetengan Utara, and Tonsewer Induk.
- Total households had 1-10 years of marriage.
- Housewives worked to seek for household's additional income
- Family had toddlers
- Every sampling village determined by 15% of working housewives was respondent

Table 2: Total Working Housewives

No.	Name of Villages	Total Working Housewives (People)	Total Respondents (People)
1	Tompaso Dua	91	14
2	Pinabetengan Utara	62	9
3	Tonsewer Induk	47	7
Total		200	30

The model analysis used two approaches, such as descriptive and statistic. The descriptive was a model describing or providing a depiction of the observed object by the collected data. In addition, the statistic was a model of multiple regression function analysis. The equation model in the form of a natural algorithm was as follows:

$$\ln C = b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + \varepsilon \quad (1)$$

Where:

C	=	Total toddler's milk consumption (gram/month)
X ₁	=	Total household incomes (Rupiah/month)
X ₂	=	Mother's educational background (year)
X ₃	=	Age of toddlers (month)
X ₄	=	Percentage of expenses of milk consumption (%)
X ₅	=	Price of milk (Rupiah/gram)
b ₀	=	Constant
b ₁ – b ₄	=	A measured parameter coefficient
ε	=	Error

III. RESULTS AND DISCUSSION

3.1. Characteristics of respondents

Age is the number measured since born with a unit of the year. Based on respondents' age, it can be said that their age was classified into productive age, so it had a better impact on accessing information related to milk consumption. Age is one of the determining factors of someone's nutrition [4].

Table 3. Characteristics of respondents

Details	Total Respondents (people)	Percentage (%)
Age		
26 – 29	20	66.7
29 – 32	10	33.3
Type of occupations		
Civil servant	14	46.7
Private employee	9	30.0
Entrepreneur	7	23.3
Income (Rp/month)		
4.200.000-5.999.000	22	73.3
6.000.000-8.000.000	8	26.7
Education (S1)		
Senior high school	16	53.3
Undergraduate	14	46.7

According to [3], parents' occupation has an impact on milk consumption, mainly for toddlers. A private employee (Table 3) was people working in a private company, store, or restaurant. Based on the results of the research, respondents' occupation was mostly permanent job and had included in the welfare category due to respondents had already fixed monthly income.

3.2. Milk consumption

Dairy is one of the husbandry products, used as an ASI substitute, mainly for toddlers who have not directly obtained ASI from their mother. A baby must obtain ASI until 2 years because milk has a significant role in a baby's nutritional status [5]. The milk intake, containing protein and energy, could improve toddlers' intelligence and be equal with age since the over intake would impact children's weight and growth. The research results by [6] in the District of Semarang Timur, showed that the consumption of formula milk between 15-24 times/day with the content of 11.3 grams per 1 spoon of milk, or equally 170-270 grams/day toward 0-6 months baby can cause obesity. It was in line with [7] stating that the formula milk intake of more than 200 grams/day in baby age relates to the acceleration of children's weight and height development than those only given ASI.

Table 4 : Total toddlers' milk consumption and age of toddlers

Milk Consumption (gram/month)	Total Toddlers (toddler)	Average of age
2,800 – 4,200	23	30.6
4,201 – 5,600	7	34.7

The toddler's milk consumption can be seen in Table 4. In detail, the average total toddler's milk consumption of 30.6 months of toddlers was 109 grams/day and the average milk consumption of 34.7 months of toddlers was 158 grams/day. Thus, the average

total toddler's milk consumption in the District of Tompaso Barat was 3,733 grams/month or 120 grams/day/toddler. The first day of formula milk intake is before 6-months of age and the average consumption of formula milk of >100 grams/day has 7.0 times of risk suffering obesity [4].

3.3. Analysis of the determining factors in toddlers' milk consumption

The result of the multiple regression analysis was as follows:

$$\ln C = 2.021 + 0.478\ln X_1 + 0.055\ln X_2 - 0.006\ln X_3 + 0.737\ln X_4 - 0.604\ln X_5 + \varepsilon \quad (2)$$

Based on the equation above, the determining factors of toddler's milk consumption in the District of Tompaso Barat were presented in Table 5.

Table 5: Results of multiple regression analysis of the determining factors in toddlers' milk consumption

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Constant	2.021		0.713	0.483
Household income (X_1)	0.478	2.835	2.584	0.016
Mother's educational background (X_2)	0.055	0.185	0.228	0.821
Age of toddlers (X_3)	-0.006	0.241	-0.102	0.920
% Expenses of milk consumption(X_4)	0.737	0.061	5.097	< .001
Price of milk (X_5)	-0.604	0.145	-4.543	< .001
R-squared	0.589			
Adjusted R-squared	0.504			
F-statistic	6.889			
Prob(F-statistic)	< .001			

The value of adjusted R-square was 0.504, describing that a fluctuating variation of total toddler's milk consumption was influenced by the variable of household income (X_1), mother's educational background (X_2), age of toddlers (X_3), percentage of expenses for milk consumption (X_4) and price of milk (X_5) as of 50.4%, and the rest was 49.6% as explained by other variables outside of this model.

3.4. Household income

Income was a sum of money earned by someone from his/her daily, weekly, or monthly work. Household income had a significant role in satisfying the need for toddlers' milk consumption in the District of Tompaso Barat. Conversely, the results of this research were contradicted by [8], observing the intake of formula milk and household income toward nutrition status of the toddler in Puskesmas (Public Health Center) Ganjar Agung Metro Barat and arguing that none of the relationships between household income and toddler's nutrition status exists. On average,

household income (Table 3) had been above the Provincial Minimal Wage Standard (UMP).

According to the analytical results, it depicts that the factor of household income had a positively significant impact ($P < 0.05$) on toddlers' milk consumption. Similarly, it resonated with [3, 9, 10] postulating that there is a meaningful relationship between a toddler's milk consumption and a parent's income.

Further, based on the results of this research, the household income was used to buy dairy. It means that the father did not only seek for living for a family, but also the mother involved in the working activities to earn income. The findings of this research, also, depict that income was the determining factor to buy milk for toddlers in the District of Tompaso Barat.

3.5. Mother's educational background

Education becomes a vital issue in improving someone's knowledge in any field. The higher someone's education,

the easier receiving information and the greater the gaining knowledge [11]. Also, education is highly influenced by parents' way of thinking in decision-making, mainly dairy consumption. According to [12], the education level can shift someone's view on consuming toddler milk. In this research, the result shows that respondents' educational background could be said to have more knowledge, so it had a better impact on decision-making in consuming dairy. [9, 13] stated that a mother's education has a positive impact on total consumption at the household level.

In detail, based on the analytical results, the mother's educational background had a positive impact, but a non-significant impact on the toddler's milk consumption. It was in line with [3], stating that there is a meaningful relationship between a toddler's milk consumption and the mother's educational background, but there is a difference from the father's educational background. Then, having toddlers, parents' educational level is higher, so their knowledge of the benefit of the nutritional substance, such as milk, is much better. The impact of a mother's education to milk consumption was in accordance with [2], arguing that decision-making in milk consumption for a toddler's growth is dominated by the role of the mother.

3.6. Age of toddlers

The analytical results demonstrate that age of toddlers had a negatively insignificant impact on total toddlers' milk consumption. Moreover, the factor of toddler age did not become the determinant in milk consumption. Similarly, the finding corresponded to [3], arguing that none of a meaningful relationship between milk consumption and the age of toddlers exists. From the results of this study, the age of toddlers started from nine months to four years four months with different milk consumption. The total milk consumption decreased as toddlers grew due to their nutrition sufficiency could be satisfied by the consumption of other foods.

3.7. Allocation of milk consumption expenses

Engel's Law postulated that the higher income followed by social welfare, the fewer expenses proportion of the foods group. The average expenses done by households in the District of Tompaso Barat to buy milk was 7.30% of their income. The results of regression analysis show that the percentage of expenses for milk consumption had a positively significant impact on total toddler's milk consumption. It demonstrates that parents were more preferred in increasing total milk purchasing than replacing it with milk having a complete nutritional content or better quality.

3.8. Price of milk

According to the analytical results, the price of milk had a negatively significant impact on toddlers' milk consumption. In the same vein, [14] described that the perception of milk price has a positive impact on consumers' purchasing decisions. From the research, it finds out that the product of formula milk consumed by toddlers had price differences due to brand and weight of milk, nutrition needs, and package (cartoon, can, and sachet), but, typically, parents bought milk in the nearest supermarket due to cheaper price than in the traditional market. The need for toddler milk was important, so parents would strive to buy it in satisfying their toddler's nutrition needs. Hence, the factor of milk price became one of the determining factors in consuming toddler milk in the District of Tompaso Barat. [13] stated that the milk price which showed quantity and quality was positively influencing the milk consumption expenditure. It meant that the higher the quantity and quality of milk was consumed, the greater the expenditure of milk would be spent.

IV. CONCLUSION

The average total toddler's dairy consumption in the District of Tompaso Barat is 120 grams/day/toddler or 3.733 grams/month/toddler.

The factors having a positive impact on total toddler's milk consumption are household income, mother's educational background, and percentage expenses of dairy consumption, but the educational background has no significant impact. Additionally, the factor of toddler's age and price have a negative impact on total toddler's dairy consumption, but the price is the only factor having a significant impact.

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